

REMARKS

Claims 1-5 and 7-9 are presently pending in the application.

Rejection Under § 112

In the Office Action, the Examiner has rejected claims 1-5 and 7-9 under 35 U.S.C. § 112, first paragraph, as lacking support in the specification. Specifically, the Examiner takes the position that the phrase “wherein the composition contains no zinc dialkyldithiophosphate” is not supported in the application as filed. Applicants previously argued that this phrase is supported in the specification at least at page 29, last 9 lines and in Inventive Example 1 and 3-9. However, the Examiner argues that the specification does not teach that the lubricating oil compositions contain no zinc dialkyldithiophosphate, but teaches at pages 28-29 that the lubricating oil composition of the invention may contain an antiwear agent other than component (A) which includes zinc dialkyldithiophosphate. Applicants respectfully traverse this rejection as follows.

It is taught in the present application that, “The lubricating oil composition of the present invention may contain an anti-wear agent other than Component (A)... Examples of an anti-wear agent other than Component (A) include... zinc dialkyldithiophosphates...” (page 28, line 16 to page 29, line 1, emphasis added). In other words, inclusion of zinc dialkyldithiophosphates is optional, and thus compositions without zinc dialkyldithiophosphates are within the scope of the invention. It is further taught at page 32, lines 14-21 that:

... it is particularly preferable not to use the sulfur-containing anti-wear agent. A lubricating oil composition with significantly excellent base number retaining properties and high-temperature detergency can be obtained by decreasing the amount of the sulfur-containing anti-wear agent to 0.1 percent by mass or less (emphasis added).

Additionally:

Even though the lubricating oil composition for internal combustion engines, of the present invention is decreased in the amount of a sulfur-containing agent such as ZDTP having both anti-wear and anti-oxidation properties or contains no such an agent at all, the composition is extremely improved in anti-oxidation properties and in base number retaining properties, i.e., long-drain properties, and also

excellent in high-temperature detergency and low friction characteristics, but free from the decrease of anti-wear properties. (col. 38, lines 2-12, emphasis added)

These citations clearly teach preferred compositions which lack sulfur-containing anti-wear agents, such as ZnDTP, and further describe the favorable properties that are achieved in the absence of such a component.

Finally, Inventive Examples 1, 3, 4, and 5-9 contain no zinc dialkyldithiophosphates. Specifically, Examples 1, 3, and 4 contain no sulfur-containing anti-wear agent A or B (see footnotes 6 and 7 in Table 1), and Inventive Examples 5-9 contain no sulfur-containing anti-wear agent A (see footnote 10 in Table 2). As described at page 40, lines 8-16, Inventive Examples 1, 3, and 4 (containing no zinc dialkyldithiophosphate) had significantly higher base number retaining properties than the compositions of Comparative Examples 1 and 2 containing ZDTP as a sulfur-containing anti-wear agent.

Applicants respectfully submit that at least in view of these teachings and examples, the specification clearly supports the statement that the composition contains no ZnDTP. Reconsideration and withdrawal of the §112 rejection are respectfully requested.

Prior Art Rejection

The Examiner has again rejected claims 1-5 and 7-9 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,569,818 of Nakazato ("Nakazato") in combination with U.S. Patent No. 5,792,733 of Minami et al. ("Minami") or U.S. Patent No. 5,245,070 of Nishikawa et al. ("Nishikawa"). The Examiner again argues that Nakazato teaches a lubricating oil composition having specific phosphorus, sulfur, and sulfated ash contents which comprises: (a) a major amount of mineral base oil having a low sulfur content of at most 0.1 weight %, (b) an ashless alkenyl or alkyl-succinimide dispersant or derivative thereof in an amount of 0.01 to 0.3 weight % in terms of nitrogen content, and (c) a metal-containing detergent such as an alkali metal or an alkaline earth metal salt of an alkylsalicylic acid in an amount of about 0.2 to 7 weight %. The composition may allegedly include other metal detergents, such as sulfonate detergents, (d) a zinc dialkyl-dithiophosphate in an amount of 0.01 to 0.1 weight % in terms of phosphorus content, and (e) an oxidation inhibitor which may be a phenol compound or an amine compound in an amount of 0.01 to 5 weight %.

The Examiner further argues that Nakazato teaches that the lubricating oil compositions may contain other auxiliary additives, such as phosphoric acid esters and phosphorous acid esters. The Examiner acknowledges that Nakazato does not teach or suggest the claimed specific phosphorus acid ester compound, a triphosphate of formula (1).

However, the Examiner argues that such triphosphate compounds are well known in the art as antiwear agents in lubricating oil compositions, as evidenced by Minami or Nishikawa. The Examiner concludes that it would have been obvious to one having ordinary skill in the art at the time of the invention to have added the triphosphate compound of Minami or Nishikawa to the oil composition of Nakazato if its known imparted properties was so desired.

In response to Applicants' previous amendments regarding the superior properties of compositions containing zinc dialkyldithiophosphate, the Examiner argues that zinc dialkyldithiophosphates are extremely well known lubricating oil additives which are effective as antioxidants and as extreme pressure/anti-wear agents. Nakazato allegedly teaches the addition of conventional zinc dialkyldithiophosphates to the lubricant composition in a very minor amount of 0.01 weight % in terms of phosphorus content. The Examiner thus concludes that it would have been obvious to one having ordinary skill in the art at the time of the invention to have omitted the conventional zinc dialkyldithiophosphate component from the lubricating oil composition of Nakazato if the function attributed to this component was not desired or required. Applicants respectfully traverse this rejection as follows.

As previously explained on the record, Nakazato teaches a lubricating oil composition having specific phosphorus, sulfur, and sulfated ash contents and containing: (a) a mineral base oil, (b) an ashless alkenyl or alkyl-succinimide dispersant, (c) a metal-containing detergent, (d) ZnDTP, and (e) an oxidation inhibitor. Essential component (d), zinc dialkyldithiophosphate, is present in an amount of 0.01 to 0.1 wt % in terms of phosphorus content (col. 6, lines 26-37). The ZnDTP preferably contains an alkyl or alkylaryl group having 3 to 18 carbon atoms, and particularly preferred are alkyl groups derived from a secondary alcohol or a mixture of secondary and primary alcohols, since the latter are taught to provide high heat resistance. The ZnDTP is an essential component of the Nakazato composition and is contained in all of the Example compositions of Nakazato.

Accordingly, Nakazato does not teach or suggest a composition containing no zinc dialkyldithiophosphates as claimed. Furthermore, it would not have been obvious, as asserted by

the Examiner, to have omitted such a component if the function attributed to it was not desired or required. To the contrary, Applicants cannot understand why one skilled in the art would have been motivated based on Nakazato to omit a component which is taught to be essential and which is taught to provide desirable high heat resistance. If such a component was intended to be optional, it would have been included by Nakazato in the list of optional auxiliary additives described at col. 7, line 59 to col. 8, line 11. Accordingly, the presently claimed composition would not have been obvious based on Nakazato, and even modification of the Nakazato composition to include a triphosphate compound of Minami or Nishikawa would still yield a composition containing ZnDTP, since neither of the secondary references would provide a motivation for omitting ZnDTP from the Nakazato composition.

The results exhibited by the presently claimed compositions would also not have been expected based on the proposed combination of Nakazato with Minami or Nishikawa. As shown in Table 1 of the present application, the composition of Inventive Example 1 (containing no ZnDTP) exhibited superior properties relative to the compositions of Comparative Example 1 and Inventive Example 2 (both containing ZnDTP). Comparative Example 1 contains about 0.08 mass % in terms of P content (0.15 mass % in terms of S content) and is thus very similar to the compositions of Nakazato (having a P content of 0.01 to 0.1 wt %). Inventive Example 2 contains about 0.04 mass % in terms of P content (0.08 mass % in terms of S content) and is thus similar to the compositions in Examples 1-10 of Nakazato (having 0.03 wt% P) combined with the triphosphate compounds of Minami or Nishikawa. It would not have been expected based on Nakazato, Minami, and/or Nishikawa that eliminating ZnDTP would provide a composition that exhibited superior properties in terms of base number remaining rate or hot tube test, particularly because Nakazato does not teach or suggest that ZnDTP is optional or the benefits that may be achieved by eliminating it.

Finally, present claim 5 recites that the alkali metal or alkaline earth metal detergent is a mixture of an alkali metal or alkaline earth metal salicylate detergent having a metal ratio represented by “valence of metal x metal element content (mol)/soap group content (mol)” of 1.5 or less and an alkali metal or alkaline earth metal sulfonate detergent. An exemplary composition containing a combination of a specific salicylate detergent and a sulfonate detergent is described in Inventive Example 7 (see Table 2 of the present application). However, while Nakazato teaches a metal-containing detergent which may be a specific metal salt of an

alkylsalicylic acid (col. 4, lines 61-67), Nakazato does not teach or suggest the specifically claimed metal ratio of the alkylsalicylate, and neither Minami nor Nishikawa cures the deficiencies with Nakazato.

For at least these reasons, no *prima facie* case of obviousness has been established based on the proposed combination of references, and reconsideration and withdrawal of the § 103(a) rejection based on Nakazato in view of Minami or Nishikawa are respectfully requested.

In view of the preceding Remarks, Applicants respectfully submit that the pending claims are patentably distinct from the prior art of record and in condition for allowance. A Notice of Allowance is respectfully requested.

Respectfully submitted,

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